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MALARIA PREVENTION.

The Prevention of Malaria. By Major Ronald Ross, C.B., F.R.S. With contributions by Prof. L. O. Howard and others. Pp. xx+669. (London: John Murray, 1910.) Price 21s. net.

FEW if any subjects bearing on the prosperity of tropical lands can be of greater importance than the effective control of those tropical diseases which have often proved barriers, sometimes insuperable, to their development. This will readily be admitted with reference to the colonisation of such lands by white men, but it is of at least equal importance for the welfare of the indigenous races the progress of which towards a higher civilisation is most intimately bound up with an increased immunity from disease and a higher standard of hygienic environment.

Of all the diseases prevalent in tropical and sub-tropical countries there is none to compare with malaria, either in point of view of frequency or of disastrous results in respect of the general health of a population. This has been acknowledged to a certain extent from the earliest times, but it has been left for modern science to demonstrate the true magnitude of the problem and to point out scientific and practical measures by which the damage caused by malaria may be controlled.

In this volume, by Major Ronald Ross, we have an admirable account of the whole of the many-sided problem of malaria prevention, stated in clear and eloquent fashion, and developing the subject in so logical a sequence that the reader is carried in complete sympathy with the author towards an acceptance of the preventive measures which he advocates as being the best at present available.

No one has better right to speak with authority on every branch of the subject than the author, whose discovery of the mosquito transmission of the disease laid the foundation for the majority of the preventive measures which have already been of inestimable service to humanity. The discovery of the malarial parasite by Laveran, epoch-making as it was, in itself did little to help in the prevention of the disease, and only a knowledge of the complete life-history of the parasite could teach us where and how to apply measures directed towards the prevention of this scourge of humanity.

Since this knowledge became available, numerous books have appeared, in many tongues, dealing with prevention, but the immense majority of these are either purely technical or purely popular, and there was a distinct place for a volume such as this, which, while avoiding unnecessary technical and medical detail, deals with each branch of the subject in comprehensive fashion and affords such a complete guide as is imperatively needed by all who have to deal with the subject practically, whether from the point of view of the health officer or from that of the civil administrator of a country or district. To obtain success in a malaria campaign it is not enough to be told what to do, one ought to know in addition the "why" of each step.

Throughout the whole of the work the author speaks, as he obviously feels, strongly on the half-hearted manner in which preventive measures have been applied by many bodies in administrative control of various malarious countries. He acknowledges that in many instances the cause of this official indifference is apprehension of excessive expenditure, but he shows clearly that, even from this low point of view, a grudging expenditure is bad finance. Granted that the measures he so ably advocates are carried out with intelligence, and under continuous and proper supervision, few who follow his arguments and examples will differ from him that few items in a colonial budget would have been better expended.

After an interesting historical account of malaria, from the earliest classical allusions to the discovery of the parasites and of the mode of transmission by anopheline mosquitoes, a clear account is given of the fundamental observations and experiments which have led up to our present-day knowledge. Next follows a most interesting chapter on the parasitic invasion of man. This will be read with perhaps the greatest interest by those who have practical knowledge of the disease, since it is replete with information of the most valuable character on such points as the number of parasites which may be introduced by the mosquito, the number which must develop from those introduced before illness is produced in man, the period of incubation, the limitation of the invasion, &c. Even those who are familiar with most of the subject-matter here dealt with will find much to interest them, since there is scarcely a point discussed which has not a direct bearing upon the question of prevention.

Major Ross lays great stress upon the necessity for a more accurate study of the disease by exact quantitative methods, and his arguments and illustrations in connection with this point will find general acceptance. For instance, he advocates a more accurate study of the numbers and local distribution of the particular anopheline mosquitoes which are found to transmit malaria in a given locality, since, without such a foundation, it is not possible to judge with any degree of accuracy as to the effects of the measures which may have been adopted with a view to their destruction. Again, in assessing the value of different preventive measures, such as mosquito destruction, the systematic use of quinine or the protection of individuals by mosquito netting, an accurate measure of the amount of malaria present in a particular population is an essential preliminary. He devotes considerable space to the best means by which such estimations may be carried out, and discusses the relative value of estimates of the actual number of individuals who have parasites in their blood at a given time, the estimation of the number who show signs of present or recent infection by enlargement of the spleen, the constantly-sick-rate, the death-rate, &c. He concludes that the most generally useful of these is the spleen-rate, since an actual microscopical examination of the blood demands too great labour. In this connection a good example of his mathematical reasoning shows that in a quarter of an hour a careful microscopical examination of a sample of blood for

parasites will only have searched one-fiftieth of a cubic millimetre. Now, since this volume is only about 1/150,000,000 of the blood in a man's body, it follows that there is a considerable chance that not a single parasite might be detected, although the individual might have 150 million of them in his circulation at the time!

Major Ross's preference for the determination of the "spleen-rate" appears justifiable on grounds of expediency, but, although he points out most of the more obvious fallacies to be guarded against in making such estimations, he scarcely appears to attach sufficient importance to these. For instance, there is very little experience accumulated as to the length of time which some degree of splenic enlargement may persist after recovery, while the splenic enlargement caused by ankylostomiasis, as has recently been pointed out by Darling, would invalidate the tests in certain localities.

The section dealing with the laws which regulate the number of anophelines in a locality will be fascinating reading to all who have some practical knowledge of these pests, and is full of most suggestive matter, much of which will doubtless be put to the test by those who have opportunity. The problem of attempting the destruction or limitation of mosquito life, under conditions where extensive breeding places abound, and where the usual measures appear at first sight impracticable, are boldly faced, and those who are satisfied with Major Ross's mathematical demonstrations on such points as the variations of mosquito density due to various causes, the random scatter of mosquitoes from a given point, &c., will find it necessary to revise some views which have been and are extensively held on the impossibility of limiting the mosquito population in certain conditions.

The thoroughness with which the earlier portions of the book have dealt with all branches of the subject greatly adds to the value of the chapter dealing with the selection of the preventive measures to be made in a given instance, since one is able to follow the author in his clear exposition of the manner in which one must study the local conditions in every instance before deciding on the plan of campaign. As he is careful to point out, without such close study of these conditions a scheme might be drawn up which was foredoomed to failure, and large sums of money might uselessly be thrown away. The chapter abounds in valuable practical hints for the guidance of those responsible for the organisation of such campaigns, and it may also be studied with the greatest profit by laymen whose only desire is to know how best they, individually, may avoid infection on proceeding to a malarious country.

The second half of the book consists of a series of articles by well-known authorities dealing with experiences of individual malarial campaigns in many countries, and these afford a number of object-lessons in the application of the principles enunciated in the first half. There are altogether twenty-one contributors to this portion, and the majority are recognised authorities on the subject of malaria in the particular country dealt with. For instance, the campaign

against malaria in Italy is from the pen of Prof. Celli, while that dealing with the most successful of all malarial campaigns, that in the Isthmus of Panama, has been written by Colonel Gorgas. Dr. Schilling deals with malaria in German possessions; and the measures employed in French territory are described by Dr. Edmond Sergent. The completeness of this portion of the book is indicated by the fact that it concludes with two most interesting articles on the prevention of malaria in troops in war and in peace, the former by Lieut.-Colonel C. H. Melville, and the latter by Major C. E. P. Fowler, who was associated with Major Ross in his campaign in Mauritius, to which so many allusions are made in the systematic portion.

Major Ross and his collaborators may be congratulated on having produced a work which will be of the highest value to all who are concerned with the future progress and welfare of our tropical possessions.

W. B. L.

THE BRITISH MUSEUM COLLECTION OF FOSSIL REPTILES.

- (1) *A Descriptive Catalogue of the Marine Reptiles of the Oxford Clay, based on the Leeds Collection in the British Museum (Natural History)*, London. Part i. By Dr. C. W. Andrews, F.R.S. Pp. xxiii+205+x plates. (London: Printed by order of the Trustees of the British Museum, 1910. Sold by Longmans and Co., B. Quaritch, and Dulau and Co., Ltd.) Price 25s.
- (2) *A Guide to the Fossil Reptiles, Amphibians, and Fishes in the Department of Geology and Palaeontology in the British Museum (Natural History)*. Ninth edition. Pp. xviii+110. (London: Printed by order of the Trustees of the British Museum, 1910.) Price 9d.

(1) THE museum having acquired the unrivalled collection of reptilian remains obtained with much labour and unceasing care by the Messrs. Leeds—more especially Mr. A. N. Leeds—from the brick-pits in the Oxford Clay near Peterborough, it was only fitting that they should be described in a manner worthy of their importance and value. So far as the marine forms are concerned, that is to say, the ichthyosaurs, plesiosaurs and pliosaurs, and crocodiles, the task has been entrusted to Dr. C. W. Andrews, who for several years past has devoted a large portion of his time to the study of these groups. How thoroughly well he has accomplished the work will be apparent to all specialists who study the present volume, which deals with the ichthyosaurs and plesiosaurs.

The work appeals, however, to other than specialists, for it not only serves to make known the remarkably fine state of preservation in which many of the skeletons of these strange reptiles are found, but it also contains a number of interesting observations with regard to their probable mode of life and the conditions in which they existed. So nearly complete, indeed, are many of the skeletons, that not only has it been found possible to mount several for public exhibi-